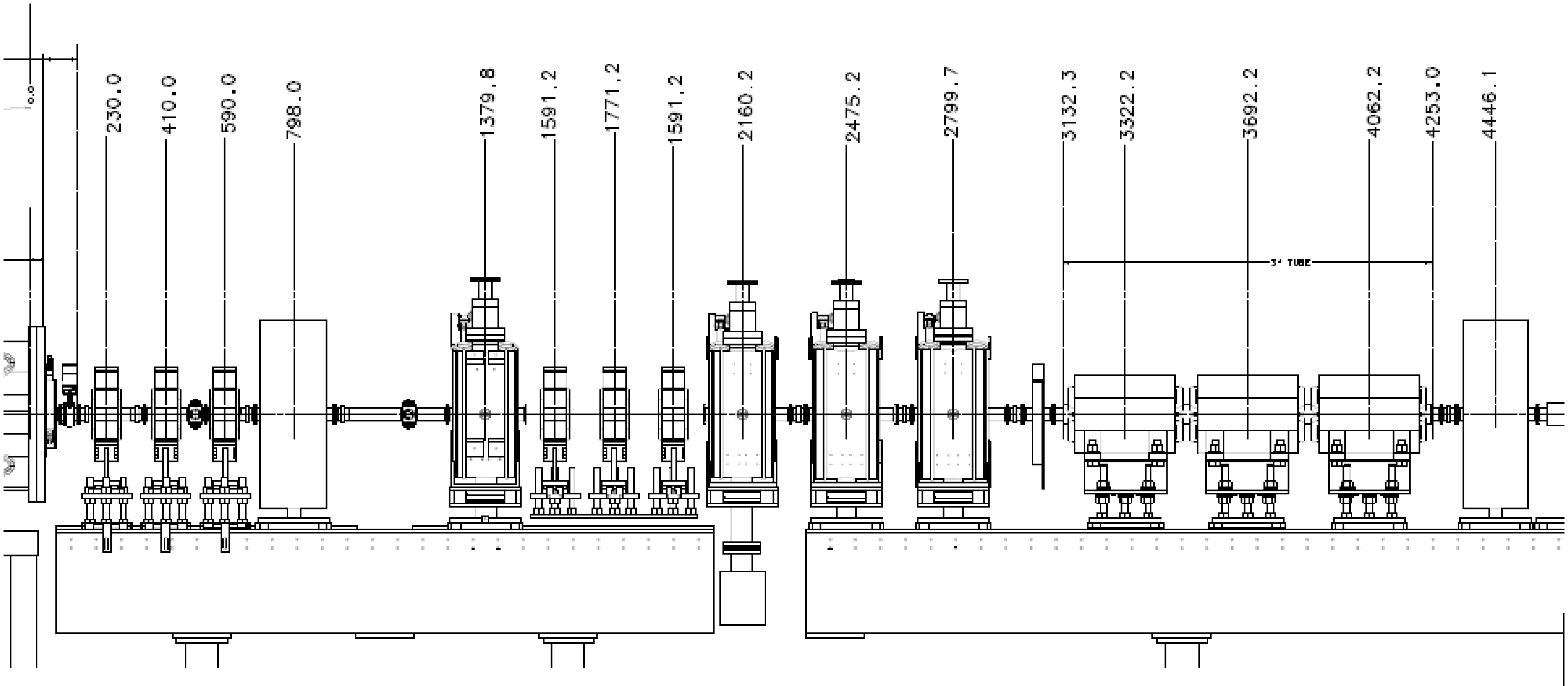
Beyond Six Cavity Test.

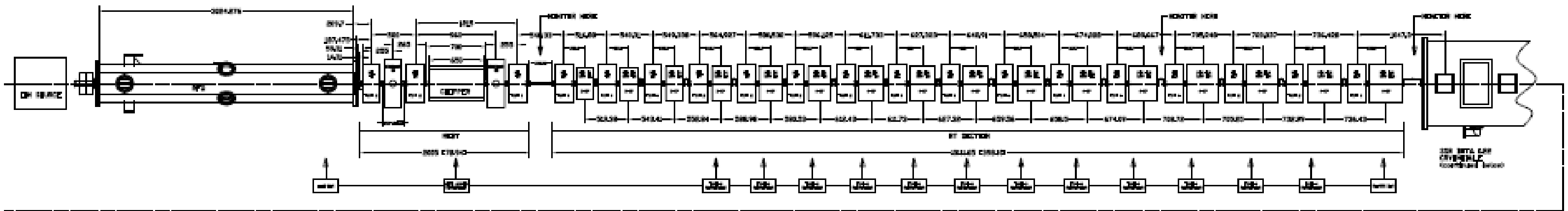
Gennady Romanov

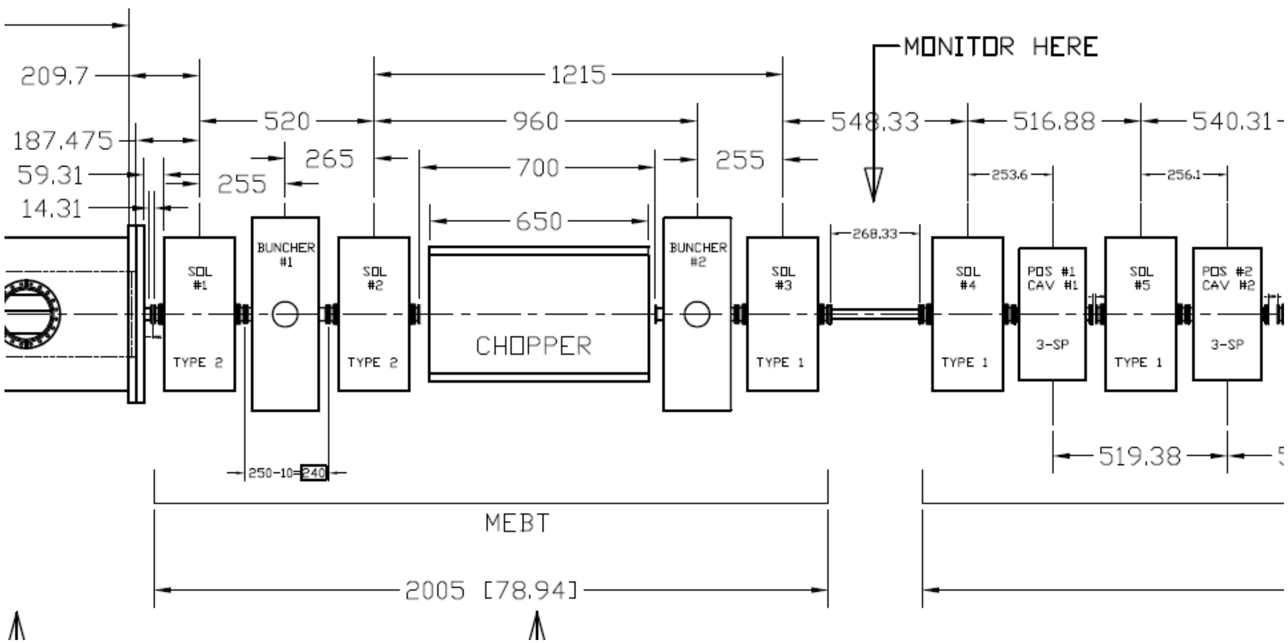
…, 2010

“Six cavity test”



NEW LATTICE LAYOUT
11/01/2007





Tasks

• RFQ installation, conditioning, coupling with ion source and 2.5 MeV beam acceleration

• Demonstration of planned RF distribution scheme and simultaneous control of RF amplitude&phase of multiple cavities with vector modulator - “Six cavity test”

• Test of SSR1 at full gradient and with beam passing through the cavity.

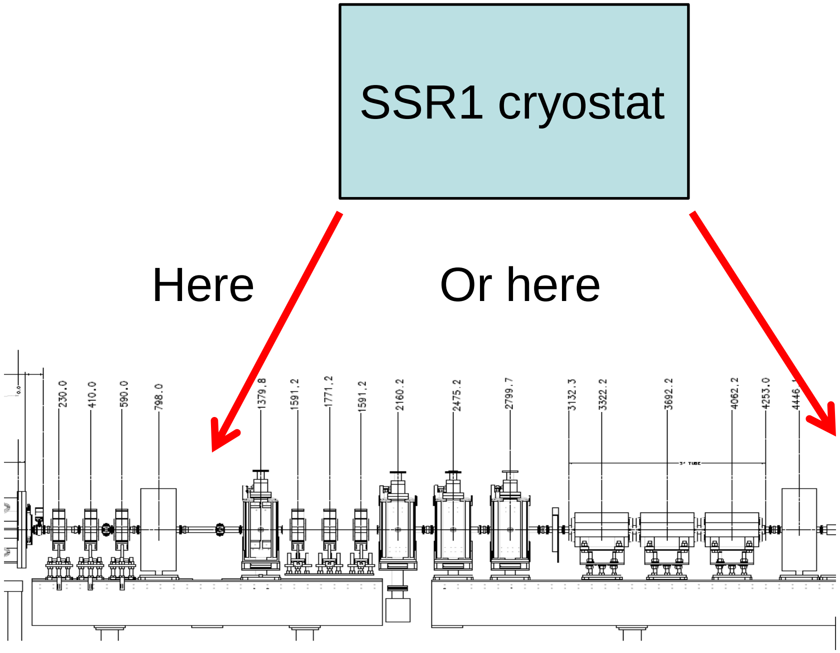
• “Short SSR cryostat test”

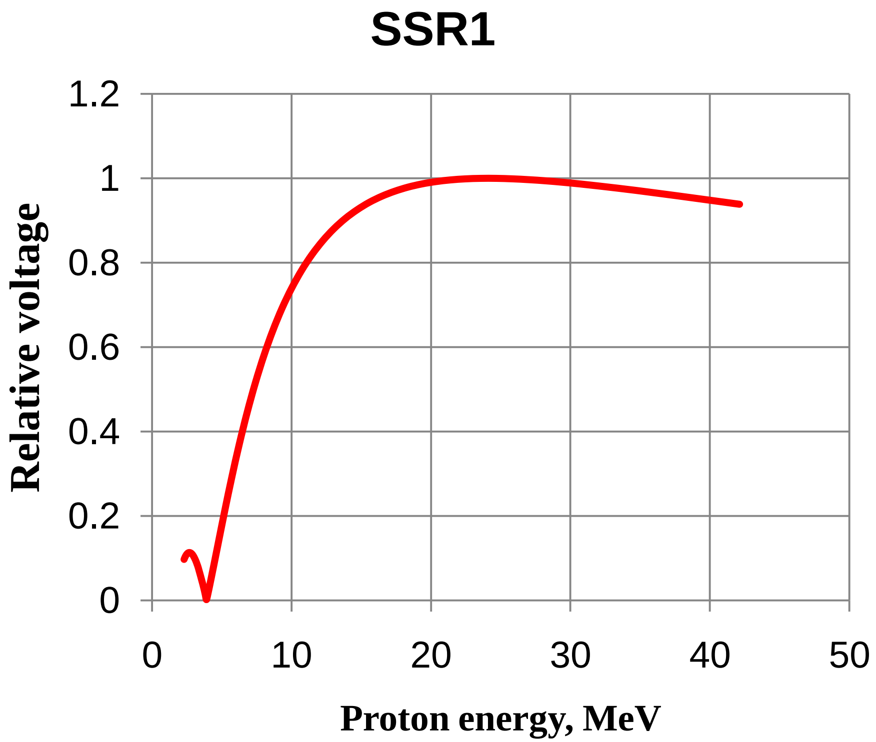
• Beam instrumentation tests

• Tests of the new accelerating cavity designs

• Chopper tests

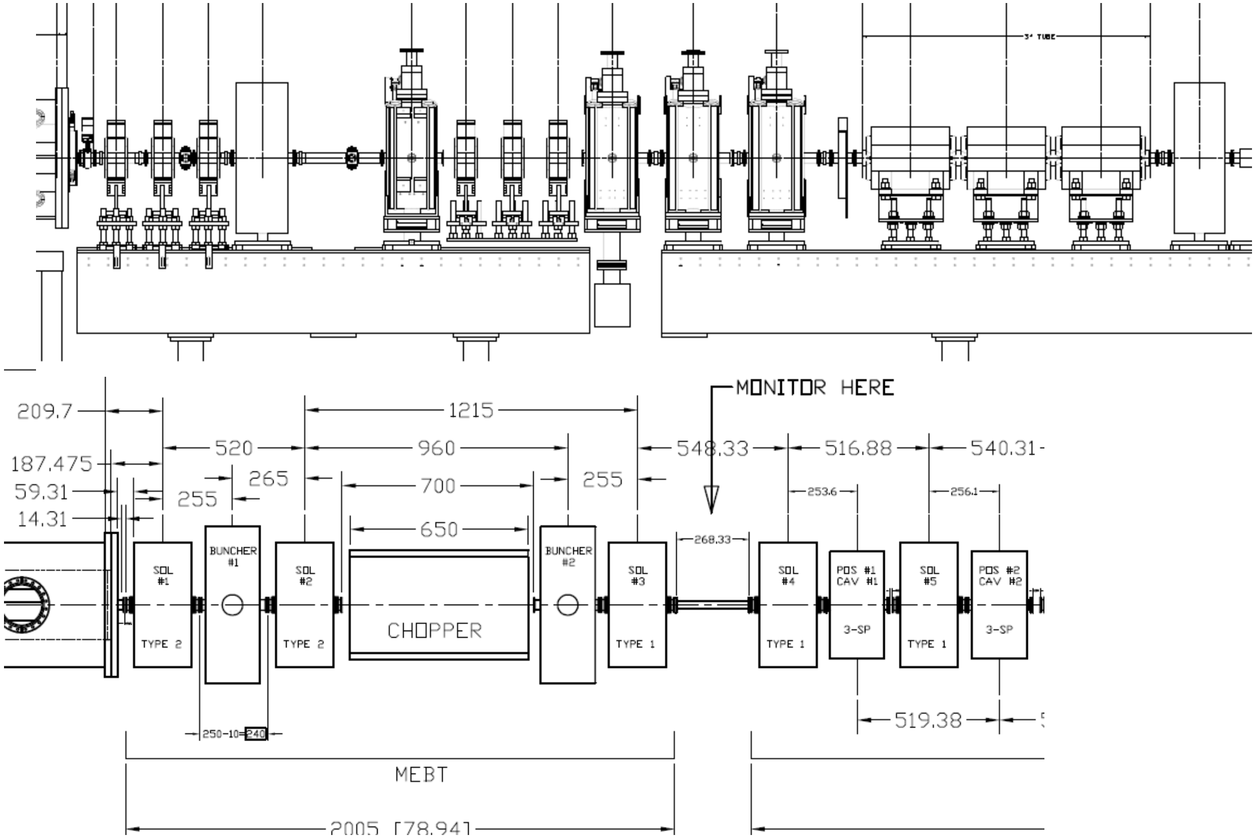
The danger of beam is that it's a source of secondary emission and dark currents, it's a source of breakdowns. We can check how SSR1 feels with beam inside without acceleration .





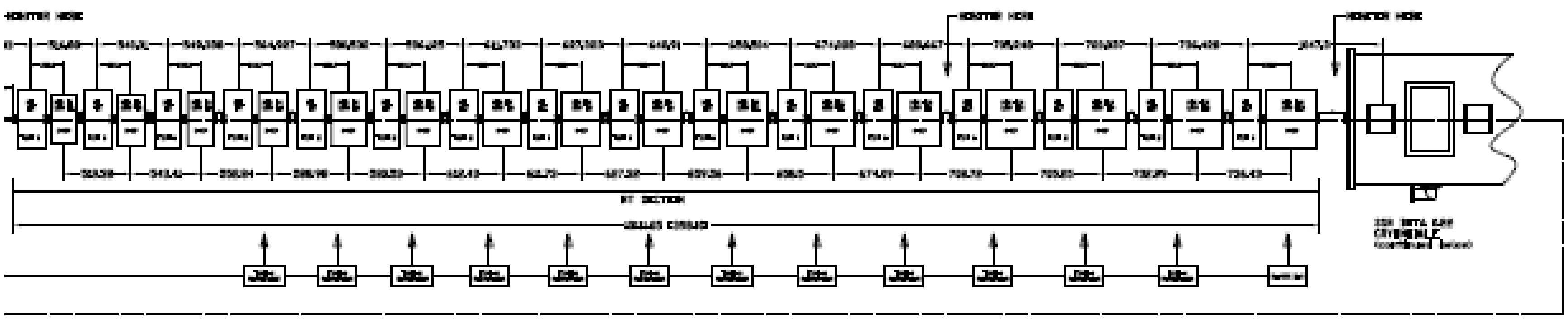
"Short SSR cryostat test"

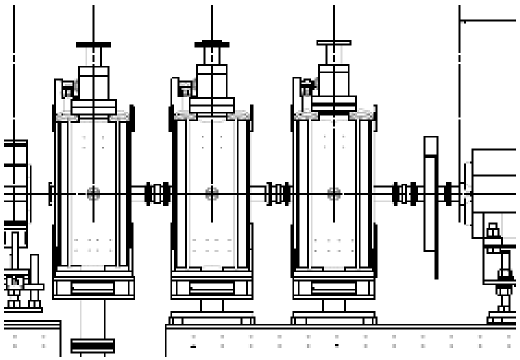
We can use the quads or replace them with the solenoids (if we don't have many of them). But in any case the MEBT will change. A most important question: do we need such a big space for chopper or it can be just big enough for some instrumentation? May be bending magnet? Or can we start acceleration with RT CH right after first (and only) re-buncher?



“Short SSR cryostat test”

We should revise mechanical layout of RT CH part, correct it if needed, and match it with “Short SSR cryostat”. The short SSR cryostat layout also will require beam dynamic simulation.





We can reduce number of solenoids combining RT CH cavities into doublets. Or even triplets, if we use alternative phase focusing (I don’t like it, but we can do it, if needed)

Design and tests of new low beta multigap accelerating cavities

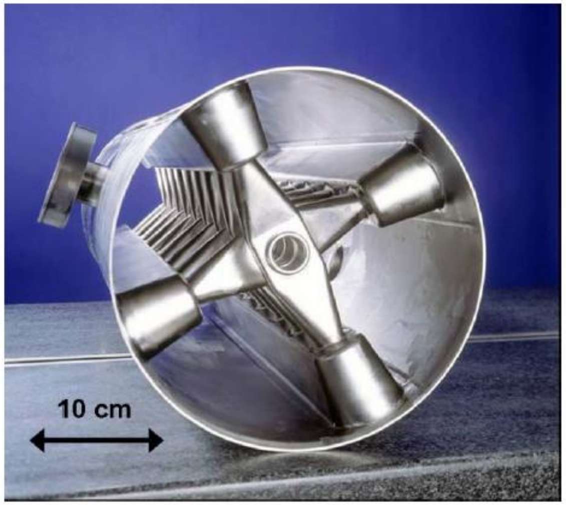


Figure 1: The superconducting CH-structure developed at IAP in Frankfurt. The prototype cavity has 19 accelerating cells, the geometrical β is 0.1, the operation frequency is 360 MHz.

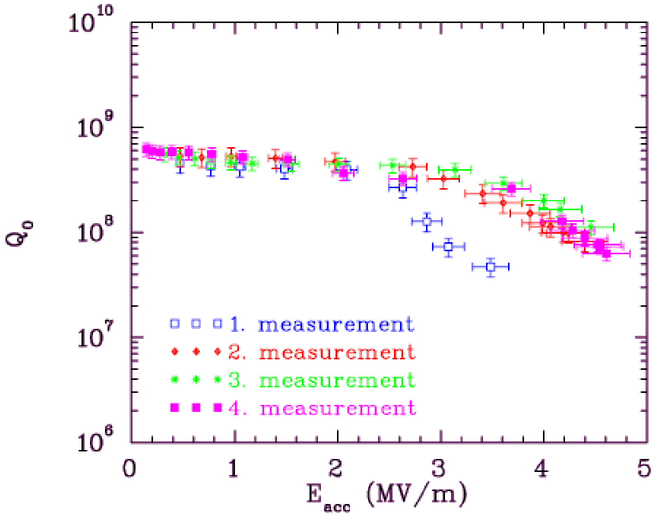


Figure 2: Measured Q-value as function of the effective acclerating gradient E_a. The maximum achieved gradient of 4.7 MV/m ($\beta\lambda$-definition corresponds to an accelerating voltage of 3.7 MV.

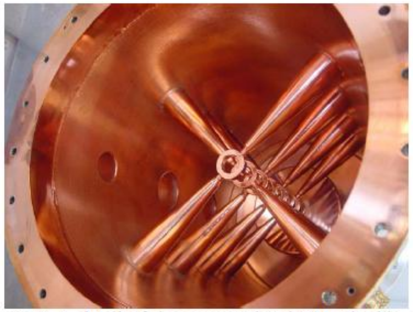


Figure 2: A detail of the copper-plated CH. The big end cell will host the internal quadrupole lens and, at the same time, will provide the needed flatness of the electric field along the cavity axis.

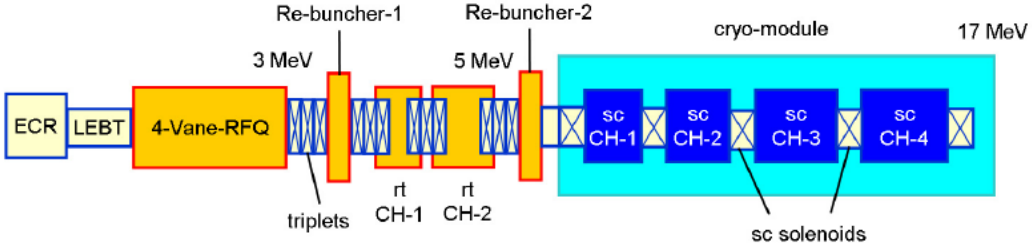
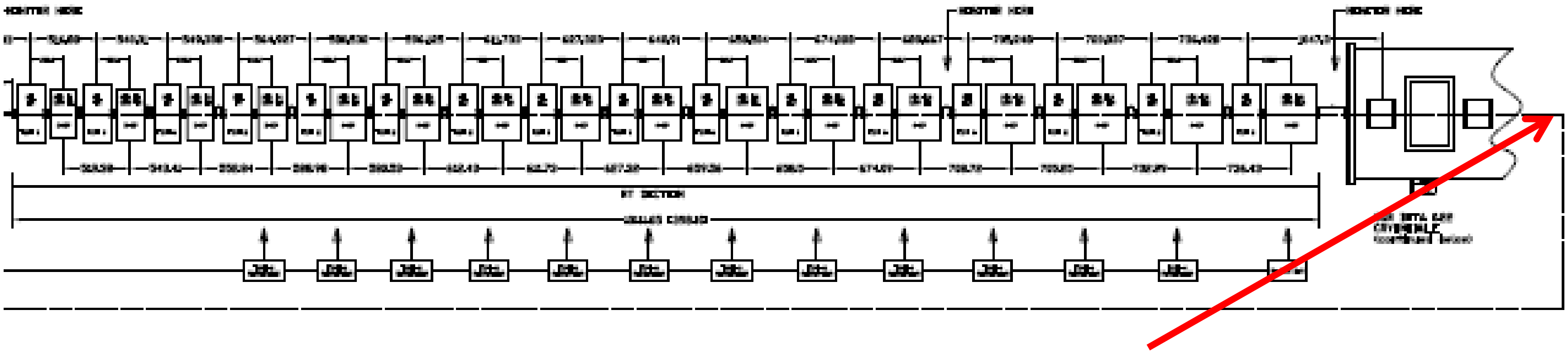


Figure 2: Layout of the 17 MeV EUROTRANS front end.

Chopper tests



We can install chopper in the end of the entire line, transport 2.5 MeV beam without acceleration and re-bunching. Test a chopper prodincing gaps in continuous beam.